To connect the U-bolt shim **428** to the U-bolt **426**, the legs **434** or the U-bolt **426** are preferably inserted through the holes **456** defined by the flanges **448** of the U-bolt shim **428**. The U-bolt shim **428** is then preferably slid up the U-bolt **426**. As shown in FIG. **24**, the U-bolt **426** preferably includes a downwardly extending alignment projection **457** adapted to fit within a recess **459** defined in the top side of the U-bolt shim **428**. The alignment projection **457** preferably has a length slightly longer than the depth of the recess **459**, and is preferably configured to fit within the recess **459**. Once the alignment projection **457** is inserted within the recess **459**, the U-bolt **426** and the U-bolt shim **428** are preferably projection welded together. For example, as shown in FIG. **24**, a flat upper electrode **461** is preferably placed against the flattened portion **437** of the U-bolt **426**, while a cylindrical lower electrode **463** is preferably contacted against the lower surface of the U-bolt shim **428**. In this manner, the electrodes **461** and **463** can be used to heat and melt the alignment projection **457** within the recess **459**. Consequently, upon cooling, a projection weld is generated between the U-bolt **426** and the U-bolt shim **428**.

To mount the saddle shim **430** of the clamp **420** on the saddle member **422**, the front and back saddle plates **462** of the saddle member **422** are preferably squeezed together thereby closing the tapered gaps **469** formed at the ends of the saddle member **422**. In such a squeezed position, the saddle shim **430** can be mounted on the top of the saddle member **422** with the ears **479** straddling the front and back saddle plates **462**. After the saddle shim **430** has been mounted on the saddle member **422**, the pressure applied to the saddle plates **462** can be released thereby allowing the saddle plates **462** to spring resiliently outward toward their normal position. In the normal position, the upper tabs **471** of the saddle plates **462** overlap the ears **479** of the saddle shim **430**. Mechanical interference between the upper tabs **471** and the ears **479** inhibits the saddle shim **430** from being inadvertently removed from the saddle member **422**.

To mount the assembled U-bolt **426** and U-bolt shim **428** on the assembled saddle member **422** and saddle shim **430**, the legs **434** of the U-bolt **426** are inserted between the front and back saddle plates **462** of the saddle member **422**. As inserted, the legs **434** extend along the end walls **465** formed at the ends **463** of the saddle member **422**. Preferably, the threaded ends of the legs **434** extend through openings (not shown) defined through the base plate **464**. Nuts **439** are preferably threaded on the threaded ends of the legs **434** to prevent the saddle member **422** from disengaging from the U-bolt **426**.

Throughout the specification, it will be appreciated that the shims could also be referred to as sealing plates, sealing members and insulators. Also, the saddle portion could also be referred to as a saddle structure, a saddle configuration, a U-bolt receiving portion, a U-bolt receiving member, a U-bolt receiving plate, a U-bolt receiving bracket, and an arrangement for receiving a U-bolt. Moreover, in certain embodiments of the present invention, the U-bolt, the saddle portion and the shims could have rectangular or square configurations adapted for clamping rectangular or square conduit.

In one particular embodiment of the present invention, the distance between the centers of the U-bolt legs is about 5.6 inches, the radial thickness of the flattened portion of the U-bolt is about 0.3 inches, the axial width of the flattened portion of the U-bolt not including the curved edges is about 0.5 inches, the total width of the flattened portion of the U-bolt is about 0.56 inches, the length of the threaded portions of the U-bolt are about 1.5 inches, the radius of the concave portion of the U-bolt is about 2.6 inches, and the length of the U-bolt is about 7 inches. Also in the particular embodiment, the length of the saddle portion is about 6.6 inches, the radius of the concave saddle portion is about 2.6 inches, and the height of the saddle portion is about 3 inches. Additionally in the particular embodiment, the shims have widths of about 1.25 inches and thicknesses of about 0.10 inches. It will be appreciated that the above dimensions are strictly illustrative and are not intended to be construed as a limitation on the scope of the present invention.

With regard to the foregoing description, it is to be understood that changes may be made in detail, especially with regard to the shape, size and arrangement of the parts without departing from the scope of the present invention. It is intended that the specification and depicted aspect be considered exemplary only, with a true scope and spirit of the invention being indicated by the broad meaning of the following claims.

We claim:

1. A clamp comprising:

a saddle member having a concave saddle portion;

a U-bolt mounted on the saddle member, the U-bolt having a concave portion oriented opposed to the saddle member concave saddle portion; and

at least one shim positioned between the U-bolt and the saddle member, the shim being made of metal and forming substantially a full cylinder at least when the saddle member and the U-bolt are drawn completely together.

2. The clamp of claim **1**, wherein the at least one shim has a width that is greater than a width of the U-bolt.

3. The clamp of claim **2**, wherein the width of the at least one shim is at least one and a half times the width of the U-bolt.

4. The clamp of claim **1**, wherein the at least one shim has a generally rectangular cross-section.

5. The clamp of claim **1**, wherein the at least one shim is arranged and configured to separate the U-bolt and saddle member from a structure desired to be clamped.

6. The clamp of claim **5**, wherein the U-bolt and saddle member are zinc-plated, and the at least one shim is made of aluminized steel.

7. The clamp of claim **1**, wherein the saddle member comprises a double saddle.

8. The clamp of claim **1**, wherein the at least one shim comprises a first curved shim secured to the saddle member concave saddle portion, and the at least one shim also includes a second curved shim secured to the U-bolt concave portion, the first curved shim having a concave side opposed to a concave side of the second curved shim, and the first and second curved shims each forming substantially a half-cylinder.

9. A clamp comprising:

a saddle member having a concave saddle portion;

a U-bolt mounted on the saddle member, the U-bolt having a concave portion oriented opposed to the saddle member concave saddle portion;

a first curved shim secured to the saddle member concave saddle portion, the first curved shim being made of metal;

a second curved shim secured to the U-bolt concave portion, the second shim being made of metal, and the first curved shim having a concave side opposed to a concave side of the second curved shim; and

wherein the first curved shim is secured to the saddle member by a snap-fit connection.

10. The clamp of claim 9, wherein the first curved shim includes a curved central portion and two retaining ears projection outward from opposite ends of the curved central portion, the retaining ears defining openings arranged and configured for receiving U-bolt legs of the U-bolt.

11. The clamp of claim 10, wherein the retaining ears define channels arranged and configured for receiving saddle legs of the saddle member, and the snap fit connection is provided between the retaining ears and the saddle legs.

12. A clamp comprising:

a saddle member having a concave saddle portion;

a U-bolt mounted on the saddle member, the U-bolt having a concave portion oriented opposed to the saddle member concave saddle portion;

a first curved shim secured to the saddle member concave saddle portion, the first curved shim being made of metal;

a second curved shim secured to the U-bolt concave portion, the second shim being made of metal, and the first curved shim having a concave side opposed to a concave side of the second curved shim; and

wherein the saddle member is formed by two opposing spaced-apart saddle plates, and the first curved shim includes at least one shim projection that extends between the saddle plates to limit movement and provide alignment between the saddle member and the first curved shim.

13. A clamp comprising:

a saddle member having a concave saddle portion;

a U-bolt mounted on the saddle member, the U-bolt having a concave portion oriented opposed to the saddle member concave saddle portion;

a first curved shim secured to the saddle member concave saddle portion, the first curved shim being made of metal;

a second curved shim secured to the U-bolt concave portion, the second shim being made of metal, and the first curved shim having a concave side opposed to a concave side of the second curved shim; and

wherein the second curved shim is secured to the U-bolt by a snap-fit connection.

14. The clamp of claim 13, wherein the U-bolt includes two opposing projections that extend inward from legs of the U-bolt, the projections being arranged and configured to provide the snap-fit connection with the second curved shim.

15. The clamp of claim 13, wherein the U-bolt includes two opposing notches defined by spaced-apart legs of the U-bolt, the notches being arranged and configured to provide the snap-fit connection with the second curved shim.

16. The clamp of claim 8, wherein the second curved shim includes a curved central portion and two flanges projecting transversely outward from the central portion, the flanges each being generally L-shaped and each having an opening arranged and configured for receiving a leg of the U-bolt.

17. The clamp of claim 8, wherein the U-bolt includes an alignment projection that fits within a recess defined by the second curved shim.

18. The clamp of claim 17, wherein the U-bolt includes a flattened region positioned opposite from the alignment projection.

19. The clamp of claim 18, wherein the U-bolt and the second curved shim are projection-welded together.

20. The clamp of claim 8, wherein the first curved shim includes radial ears that straddle the saddle member.

21. The clamp of claim 20, wherein the saddle member includes tabs that mechanically interfere with the radial ears to retain the first curved shim on the saddle member.

22. The clamp of claim 8, wherein the saddle member includes opposing front and back walls, and reinforcing end walls aligned at right angles with respect to the front and back walls.

23. The clamp of claim 22, wherein the front and back walls have oppositely disposed ends, and each end is substantially closed by a pair of the reinforcing end walls.

24. The clamp of claim 23, wherein each pair of end walls defines a tapered gap thereinbetween.

25. The clamp of claim 1, wherein the saddle member includes opposing, spaced-apart front and back walls, between which legs of the U-bolt are inserted.

26. The clamp of claim 25, further including opposing projections that project inward from the front and back walls for reducing play between the saddle member and the U-bolt.

27. A clamp comprising:

a saddle member having a concave saddle portion;

a U-bolt mounted on the saddle member, the U-bolt having a concave portion oriented opposed to the saddle member concave saddle portion;

a first curved shim secured to the saddle member concave saddle portion, the first curved shim being made of metal;

a second curved shim secured to the U-bolt concave portion, the second shim being made of metal, and the first curved shim having a concave side opposed to a concave side of the second curved shim; and

the first curved shim covering at least a central, mid-region of the concave saddle portion.

28. The clamp of claim 27, wherein the first curved shim covers the entire concave saddle portion.

29. The clamp of claim 27, wherein the first curved shim forms a half-cylinder.

30. The clamp of claim 27, wherein the U-bolt includes legs, and the second curved shim includes outwardly projecting ears defining openings for receiving the legs of the U-bolt.

31. The clamp of claim 27, wherein the clamp includes only two shims.

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